

# 2013 MIT-PRIMES CONFERENCE

Program for Research In Mathematics, Engineering, and Science  
for High School Students



MIT Stata Center. Photo: beetlebrox/flickr

**Saturday, May 18**

## Section I. Mathematics

### 9:00 am Welcoming remarks

Prof. Michael Sipser, Head of the MIT Mathematics Department  
Prof. Pavel Etingof, PRIMES Chief Research Advisor  
Dr. Slava Gerovitch, PRIMES Program Director

### 9:15 am Session 1

Kavish Gandhi and Noah Golowich, *Inequalities and partition regularity of linear homogenous equations*  
Jonathan Tidor, *Extremal functions of pattern avoidance in matrices*  
Rohil Prasad, *Investigating GCD in Euclidean domains*

### 10:35 am Session 2

Jin-Woo Bryan Oh, *Towards generalizing thrackles to arbitrary graphs*  
Raj Raina, *Minimal Ramsey graphs*  
Junho Won, *Highly non-convex graph crossing sequences*

### 11:50 am Session 3

Leigh Marie Braswell, *The Cookie Monster Problem*  
Saarik Kalia and Michael Zanger-Tishler, *Good functions and multivariate polynomials*

### 2:00 pm Session 4

Ying Gao, *Depths of posets ordered by refinement*  
Vahid Fazel-Rezai, *Equivalence classes of length-changing replacements of size-3 patterns*  
William Kuszmaul, *On q-enumeration of modular statistics*

### 3:15 pm Session 5

Gabriella Studt, *Higher Bruhat order on Weyl groups of Type B*  
Ravi Jagadeesan, *Belyi functions with prescribed monodromy*  
Ritesh Ragavender, *q-analogues of symmetric polynomials and nilHecke algebras*

### 4:30 pm Session 6

Jeffrey Cai, *Orbits of the symplectic group on partial flag varieties of type A*  
Isaac Xia, *Quotients of lower central series over Z with multiple relations*

**Sunday, May 19**

## Section II. Computer Science

Room 4-237, MIT  
[web.mit.edu/primes](http://web.mit.edu/primes)

### 9:00 am Welcoming remarks

Prof. Sridni Devadas, MIT Department of Electrical Engineering and Computer Science  
Dr. Slava Gerovitch, PRIMES Program Director

### 9:15 am Session 7

William Wu and Nicolaas Kaashoek, *How to teach a class to grade itself*  
Anish Athalye and Patrick Long, *Performance analysis and optimization of skip lists for modern multi-core architectures*  
Ajay Saini, *Modeling the opinion dynamics of a social network*

### 10:40 am Session 8

Istvan Chung and Nathan Wolfe, *A collaborative editor in Ur/Web*  
Alex Sekula and Oron Propp, *Automating interactive theorem-proving with Coq and Ltac*  
Nihal Gowravaram, *Avoidance in (2+2)-free posets*

### 12:05 pm Session 9

Steven Homborg, *Finding enrichments of functional annotations for disease-associated single-nucleotide polymorphisms*  
John Long, *Evidence of purifying selection in humans*

### 2:00 pm Session 10

Dr. Gil Alterovitz, Division of Health Sciences and Technology, Introductory remarks  
Ben Zheng, *Removing disorder in drug resistance-related proteins in tuberculosis through hill-climbing algorithms*  
Peijin Zhang, *Leveraging disordered-ordered interactions to yield new targets and drugs for tuberculosis*

### 3:00 pm Session 11

Jonathan Patsenker, *Finding the binding sites of MoRFs on a partner protein*  
Yishen Chen, *SMART Genomics API*

## Section III. Computational and Physical Biology

### 3:50 pm Session 12

Prof. Leonid Mirny, Division of Health Sciences and Technology and Physics Department, Introductory remarks  
Boryana Doyle, *Chromatin organization: from polymer loops to topological domains*  
Carolyn Lu, *Dynamic folding of chromatin domains by active SMC-mediated loops*

### 4:50 pm Session 13

Ashwin Murali, *Lineage-dependent properties of 16S ribosomal RNA nucleotide composition*  
Hao Shen, *The impact of gene order on evolution*

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